3. Psychological Effects of Interactive Multimedia Based On Scientific Approach in Science Teaching and Learning

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Psychological Effects of Interactive Multimedia Based On Scientific Approach in Science Teaching and Learning

Psychological Effects of Interactive Multimedia Based On Scientific Approach in Science Teaching and Learning

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Abstract: This study aimed to analyze the psychological effects of interactive multimedia based on scientific approaches in science teaching and learning for junior high school students. Research and Development is used as a research method, involving three experts as validators for assessing the rightness of material, language, and media, as well as 48 students and one science teacher assessing the rightness of interactive multimedia that is created. Expert assessment of Psychological effects is interactive multimedia collected using validation sheets, student and teacher assessments were carried out using a questionnaire. Data were analyzed using descriptive statistics aided by Statistical Package for The Social Sciences (SPSS windows 22.0). The results showed that material experts, media, languages, as well as teachers and students rated interactive multimedia based on scientific approaches in science teaching and learning to provide Psychological effects in science learning (values in sequence as follows; material = 89%, media = 86%, language = 75%, students = 85% and teacher = 92%).) This result shows that interactive multimedia based on scientific approach can be used as an alternative as a standard in science learning in secondary schools.

Keywords: Interactive Multimedia, Psychological Effects, Scientific approach, Teaching and Learning

1. Introduction

Natural Sciences is a knowledge related to nature and related to events that occur in the environment [1], [2]. According to [3] , science is a collection of knowledge about natural phenomena and the environment that are studied by using scientific methods. Those statements are supported by [4] states that science learning implements a series of scientific processes that include exploration, observation, and experimentation. Science Learning [5], [6] aims to provide positive values for the students, including: aware of the beauty and regularity of nature, know the concepts and principles as well as their interrelationships, skilled and able to solve problems, able to think analytically, appreciative of science, and have a scientific attitude [7].

In carrying out the scientific process, science learning requires a practical approach [8]. One method that can be used in the science learning process is a scientific approach. A scientific approach is a method or mechanism for gaining knowledge through procedures based on a scientific method [9], [10]. The intended scientific method is to observe, ask questions, gather information, to associate, and to communicate [11]–[13]. Thus, one important component of the system approach used in the learning process is the need for media. The function of the media itself is to stimulate students'

thoughts, concerns, feelings, and interests in learning activities. The proper application of media is multimedia. The term multimedia used here is the one related to the needs of science learning. One of the multimedia that can be presented is interactive multimedia.

Interactive multimedia is a combination of three elements namely images, sound, and text that can be used to convey messages and can be controlled directly by the user [14]. The use of interactive multimedia can increase students' motivation, understanding, and concentration to achieve learning goals [15]. Psychological effects that arise in the application of interactive multimedia is that the media can stimulate students ' attention in the learning process so that students are interested in following the learning and all aspects that students need. There are some psychological principles to note in the selection and use of learning interactive multimedia: (i) able to foster motivation or passion and learning desire, (ii) Learning Media should be able to align each student's ability to be able to accept the core of learning materials.

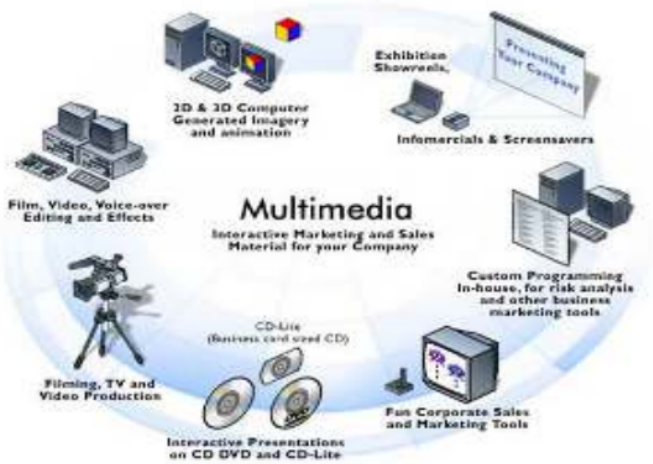

Figure 1. Variety of interactive multimedia for teaching and learning

In science learning, the use of media is still very minimal. Some research shows that there are still many students who face difficulty in understanding science lessons. Many theoretical concepts and subjects in science learning cannot be comprehended by students comprehensively, also, the learning process taught by teachers is still abstract [16], so that most students assume that science subject is very difficult. To overcome this, teachers should have a high degree of empathy for students [17] By providing a good learning process, it will ease the students to achieve maximum learning goals. Thus, the use of interactive multimedia by teachers will greatly facilitate the students in increasing motivation, understanding, and concentration in learning.

Research on interactive multimedia with different approaches, methods, and material has been done by previous studies, including inquiry-based [18], value-based [19], chemical balance materials [20], periodic systems [21], critical thinking [22]. However, researches on interactive multimedia based on scientific approaches are still very limited. The previous studies linked interactive multimedia based on a scientific approach to civic education [23]. The need for interactive multimedia in science learning can simplify the learning process [24], [25]. For this reason, this study aims to assess the feasibility of interactive multimedia based on a scientific approach toward science learning.

2. Method

This research was carried out using the Research and Development design by applying 7 out of 10 steps, namely: (1) research and information collecting, (2) planning, (3) developing preliminary

product, (4) conducting preliminary field testing, (5) main product revision , (6) main field testing, (7) and operational product revision [26]. The selection of the method is very suitable to achieve the objectives of this study. Three experts (material, language, and media), one teacher, and 48 students were involved as subjects and data sources. The assessments by experts were carried out using validation sheets while the teacher and the students' responses were collected using media assessment questionnaires which were developed in terms of feasibility in the science learning process. Next, the data were analyzed using Statistical Package for the Social Sciences (SPSS Windows 22.0).

3. Result and Discussion

The interactive multimedia is constructed based on Core Competencies (IC) and Basic Competencies (KD) [27] using the 2013 curriculum. Interactive multimedia's contents are consists of a front-page that displays the title of the material and menu choices: (i) use, (ii) main menu, (iii) practice questions. In the main menu, there are choices: (a) learning objectives, (b) core competencies, (c) scientific learning steps in which there is a collection of material in the human digestive system and exercise questions. There is a video that explains the process of digestion of food in humans that starts from the oral cavity to end in the rectum.

The classification of expert assessments and the teachers and students' responses are categorized into 4 categories, namely (i) highly feasible (76% -100%), (ii) feasible (51% -75%), (iii) less feasible (26% -50 %), and (iv) not feasible (25%) [28]. The following are the results of expert assessments as well as the teacher and students' responses toward the interactive multimedia based on a scientific approach to the science learning developed in this study. Material and media experts categorized the media as highly feasible of more than 85% while the language expert categorized the media as feasible. This shows that interactive multimedia is worth testing.

Table 1. Expert Assessment and Teacher and Students' Responses

Responses	Percentage	Explanations
Material Expert	89%	Highly Feasible
Language Expert	70%	Feasible
Media Expert	86%	Highly Feasible
Teachers	92%	Highly Feasible
Students	85%	Highly Feasible
Average	84%	Highly Feasible

The interactive multimedia is highly feasible to be used as a learning media [12], [23], [29]. Because the interactive multimedia is suitable with the accuracy of the studied material. The media created is multimedia consisting of images, text, sound, and video [30]. Developed multimedia is interactive, practical, and flexible. Interactive means that the media can be controlled by the user himself. It is practical because it consists of images, text, sound, and video that have been made into one file so that it is practical in its use. It is said to be flexible because the time and place of use can be adjusted by each user. Videos and images available on interactive multimedia are very helpful in understanding the real depiction of natural science learning, for example, in learning the process of human digestion. This is stated in the previous research that more than 75% of videos can help students in understanding material and provide clear information in learning [24]. Apart from that, [31] state that the standard of making multimedia designs in education must-have criteria in accordance with the assessment of media experts including (i) attractive appearance, (ii) good color and letter harmony, (iii) clear images, video, and audio, (iv) the response given by the media is precise and fast, and (v) easy to operate.

The results of this study are in line with previous studies which also carried out more or less the same process in developing science learning media in the form of Student Worksheets [2], [32]. The material expert stated that the material presented is in accordance with IC and BC, indicators, and

learning objectives. This is in line with the results of previous studies regarding the presentation of material that is in line with learning objectives, sequentially, and in accordance with the concept [33]. Regarding the feasibility of interactive multimedia, many previous studies have found that interactive multimedia can improve students' understanding, because multimedia is considered attractive by the students and thus increases curiosity and students' learning motivation.

The developed interactive multimedia has some advantages, namely: (1) This media can be used anytime and anywhere because this media is packaged in a file that can be easily sent and transferred from one device to another. This is in line with the results of Amar's research in his journal stating that media is suitable for use if it meets the requirements of good multimedia characteristics, namely easy media operation and easy to install on other computer devices. (2) Small data size so it does not require a large storage space on a computer device, (3) This media can be accessed offline so that even without an internet network, the learning media can be used, (4) Interactive and flexible, the duration of use is according to individuals' ability. This media is controlled by the user himself. The advantages possessed by this learning media indicate that the developed media is considered suitable for use by middle school students and equivalent, especially the digestive system material of the 8th-grade junior high school. In addition, the interactive multimedia also has several shortcomings, including: (1) Learning media are only limited to digestive system material, (2) This media cannot be applied to smartphones since it can only be applied to computers, laptops, and notebooks. (3) No interactive space is available. The shortcomings of the learning media are expected to be input for other researchers who are also developing this kind of media. However, the efforts to use interactive multimedia is continued to be done without neglecting the evaluation of quality as an appropriate tool to be applied in science learning.

4. Conclusion

This research is very feasible so that it contributes to the ideas of developing learning media using interactive multimedia. The development of interactive multimedia based on scientific approach is very possible in helping the process of science learning in school. Media and learning methods greatly affect the effects of student psychology. The conclusion that the use of interactive multimedia based scientific approaches can stimulate students and provide positive effects of learning. The results showed that the language expert considered it as feasible (75%), media and material experts considered it as highly feasible (89% & 86%), the responses of the teachers and the students are also highly feasible (92% & 85%). This shows that interactive multimedia based on scientific approach is highly feasible and can be used as an alternative media for science learning in secondary schools. This research proves that the use of interactive multimedia makes the learning process more interesting and meaningful because of the combination of video and explanations in audio form, as well as pictures using scientific learning steps.

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